

PROCEEDINGS
OF THE
BIOLOGICAL SOCIETY OF WASHINGTONTHE CRAYFISH *BOUCHARDINA ROBISONI*, A NEW
GENUS AND SPECIES (DECAPODA, CAMBARIDAE)
FROM SOUTHERN ARKANSAS

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The first specimen obtained of the crayfish described herein was collected from backwaters of Bayou Bodcaw, a tributary of the Red River, in Lafayette County, Arkansas, on 13 June 1974 by "unnamed high school students." It was forwarded to me along with other crayfishes from the southern part of the State by Henry W. Robison. Believing this specimen, a second form male, to be a member of an undescribed species of the genus *Hobbseus*, I requested Dr. Robison to attempt to secure additional material. In spite of efforts made by him, not until 26 April 1976, when a cooperative expedition was made by Dr. Robison, Raymond W. Bouchard, Michael T. Kearney, and me to collect specimens in the area where the first one had been caught, was a series containing first form males obtained. The four of us working with two seines for 2½ hours netted 150 crayfishes, 40 of which were members of the new species described below. Because of the small size of the individuals that were secured, I was not certain that we had found members of the same species that had been discovered earlier until I returned to Washington some 10 days later. None of the specimens are appreciably larger than members of the genus *Cambarellus* that frequent the same ditch.

For reasons discussed below (see "Relationships"), this small crayfish is assigned to a new genus named in honor of my friend, Raymond W. Bouchard, a fellow student of the crayfish who was indirectly responsible for my receiving the

first specimen of this new species and who aided in collecting the type-series.

I am most grateful to those persons mentioned above for their assistance in amassing the collection available to me. Thanks are extended also to Thomas E. Bowinan, Margaret A. Daniel, and Isabel Pérez Farfante, all Smithsonian colleagues, for their criticisms of the manuscript.

Bouchardina, new genus

Diagnosis: Antenna never with conspicuous fringe of setae on mesial border. Third maxilliped with teeth on mesial margin of ischium. Length of mesial margin of palm of chela of male subequal to that of dactyl and with single irregular row of 11 to 18 small corneous denticles (traces of second row sometimes present); opposable margin of both fingers in male entire and lacking conspicuous tubercles but studded with band of minute denticles; corresponding margins of fingers in female with few tubercles and single row of denticles. Areola 2.0 to 2.6 times as long as wide and constituting 25.2 to 29.5 percent of entire length of carapace (35.1 to 37.3 percent of postorbital carapace length). Ischium of third pereopod of male with slender hook; coxae of fourth and fifth pereopods lacking caudomesial boss. First pleopods of first form male symmetrical, shallowly withdrawn in sternum, bearing proximo-mesial spur, and terminating in 2 parts, neither conspicuously longer than other; mesial process broad at base, tapering rapidly to slender acute tip directed caudally and somewhat distomesially at 50 to 60 degrees to axis of appendage; central projection with antero-posterior plane broad, comparatively short, bladelike, and tilted caudomesially at about 50 degrees to main axis of appendage. Female with annulus ventralis freely movable; first pleopod absent. Branchial count 17 + epipodite.

Gender: Feminine.

Type-species: *Bouchardina robisoni*, new species.

Range: Known only from the type-locality of *B. robisoni* in Lafayette County, Arkansas.

Bouchardina robisoni, new species

Diagnosis: Same as that for genus.

Holotypic Male, Form 1 (several figures cited are from paratypes, see legend): Eyes large and pigmented. Cephalothorax (Fig. 1a, g) subovate, slightly compressed, and highest short distance cephalic to cervical groove. Abdomen narrower than thorax (4.6 and 5.3 mm). Greatest width of carapace slightly anterior to midlength of areola. Areola 2.1 times as long as wide, with few punctations, and constituting 26.1 percent of entire length of carapace (35.9 percent of postorbital carapace



FIG. 1. *Bouchardina robisoni*, new species (a, b, g, h, i, m, n, s, from holotype; l, from allotype; o, r, from morphotype; c-f, j, k, p, from paratype female; q, from paratype male). a, Lateral view of carapace; b, c, Dorsal view of distal podomeres of cheliped; d, e, Pre- and postaxial view of mandible, respectively; f, Ventral view of proximal part of antenna; g, Dorsal view of cephalothorax; h, Epistome; i, Basal podomeres of third, fourth, and fifth pereopods; j, Ventral view of antennule; k, Ventral view of distal articles of lateral ramus of antennule; l, Annulus ventralis; m, Lateral view of abdomen; n, o, Mesial view of first pleopod; p, Antennal scale; q, Caudal view of first pleopod; r, s, Lateral view of first pleopod.

length). Rostrum subplane dorsally with sparse pubescence and with elevated but unthickened, slightly convex lateral margins, latter suddenly contracted about level of midlength of penultimate podomere of peduncle of antennule, forming short acumen, tip of which slightly overreaching proximal margin of ultimate podomere. Subrostral ridge evident in dorsal aspect almost to base of acumen. Postorbital ridge somewhat concave mesially, with lateral groove, and terminating cephalically in acute spine. Suborbital angle obtuse but distinct. Branchiostegal spine acute and well developed. Surface of carapace mostly punctate and studded with fine setae; cervical spine absent.

Cephalic lobe of epistome (Fig. 1*h*) subtriangular with elevated, irregularly emarginate cephalolateral borders and with cephalomedian acute prominence; main body with broad cephalomedian depressed area, and bearing arched epistomal zygoma. Antennular peduncle (Fig. 1*j*) with strong acute spine on mesioventral margin distal to midlength of basal podomere; lateral flagellar ramus with distal 9 articles bearing aesthetascs as illustrated (Fig. 1*k*). Antenna extending caudally to base of telson. Antennal peduncle (Fig. 1*f*) with lateral spine on basis and ischium. Antennal scale (Fig. 1*p*) 2.4 times as long as wide, broadest slightly proximal to midlength, with strong acute spine distolaterally, latter exceeding distal extremity of antennal peduncle.

Third maxilliped extending cephalically to midlength of basal podomere of antennular peduncle; ischium with subacute teeth, mesial half with conspicuous stiff setae, lateral half with usual submarginal row of finer plumose setae, and distolateral angle subtruncate; exopod reaching end of proximal third of carpus.

Abdomen longer than carapace (11.4 and 10.7 mm). Pleura (Fig. 1*m*) rounded to subtruncate ventrally, only caudoventral part of fourth and sixth subangular. Cephalic section of telson with 2 spines in each caudolateral corner.

Left chela (right regenerated) (Fig. 1*b*) slender, elongate, 3.6 times as long as greatest width, subovate in cross section, and with fingers subequal in length to mesial margin of palm. Mesial surface of palm with row of 13 small, irregularly situated, corneous tubercles; dorsal surface studded with squamous tubercles; all surfaces with stiff setae interspersed among more numerous, shorter, plumose ones. Fingers with longitudinal ridges virtually obsolete; opposable surfaces of both with broad longitudinal band of minute denticles and lacking well defined tubercles; other surfaces of fingers similar to that of palm with proportionately many more stiff setae.

Carpus of left cheliped longer than broad with small squamous tubercles, except ventrally, and provided with conspicuous setae, especially along dorsodistal margin; dorsal mesiodistal angle with acute spine, mesiodistal margin with another, and third one present on podomere adjacent to distal ventrolateral articular knob. Merus with group of spiniform tubercles dorsally on distal fourth, 2 larger than others; ventral surface with rather dense plumose setal mat flanked mesially by

longitudinal row of 11, mostly acute, tubercles, and laterally by 1 large spine and 2 or 3 very weak tubercles proximal to it; laterodistal articular area supporting additional small acute tubercle. Ventromesial surface of ischium with 1 moderately large tubercle and several other poorly defined ones; sufflamen present.

Hook on ischium of third pereopod (Fig. 1i) simple, slender, arched, and slightly overreaching distal end of basis. Sternum between coxae of second, third, and fourth pereopods moderately deep, bearing fringe of plumose setae ventrolaterally, latter not obscuring first pleopod when in resting position.

First pleopods (Fig. 1u, q, s) as described in "Diagnosis." Subapical setae lacking but others present as illustrated. Basal segment of uropod with acute spine on each lobe; mesial ramus with distomedian spine not reaching distal margin of ramus.

Allotypic Female: Differing from holotype in following respects: margins of rostrum more strongly arched, almost lacking angles at base of acumen; subrostral ridges not evident in dorsal aspect anterior to level of eyes. Fingers of chela distinctly longer than mesial margin of palm; opposable margin of fixed finger with 3 corneous tubercles along proximal half of finger, distalmost largest; corresponding surface of dactyl with single corneous tubercle opposite gap between second and third tubercles on fixed finger, minute denticles forming single row on both fingers; remaining podomeres of cheliped markedly similar to those of holotype although some tubercles much less well developed.

Annulus ventralis (Fig. 1l) subelliptical with horizontal diameter about 1.5 times that of longitudinal; ventral surface not strongly contoured but with distinct troughlike depression extending caudodextrally from midcephalic region; greatest height occurring in transverse broadly rounded elevation situated on caudosinistral side of depression; sinuous sinus strongly tilted to left, originating in oblique depression dextral to median line and slightly caudal to midlength, coursing caudosinistrally across median line before making sudden turn caudally, cutting caudal margin of anulus short distance sinistral to median line. Postannular sclerite subtriangular, its width subequal to length of annulus and its length almost two-thirds that of annulus. First pleopod lacking.

Morphotypic Male, Form II: Differing from holotype in following respects: rostrum with margins more strongly arched, resembling that of allotype; subrostral ridges evident dorsally only in basal orbital region; left postorbital ridge with cephalic extremity almost truncate, right with small tubercle; branchiostegal spines rudimentary; mesial margin of palm of chela with row of about 17 small sclerotized tubercles; all tubercles of more proximal podomeres of cheliped reduced, conspicuous one on ventrolateral surface of merus in holotype represented by tubercle no larger than others nearby; hook on ischium of third pereopod greatly reduced. First pleopod (Fig. 1o, r) differing little from that of holotype except for noncorneous texture and slight inflation of central projection.

TABLE 1. Measurements (mm) of *Bouchardina robisoni*.

	Holotype	Allotype	Morphotype
Carapace:			
Entire length	10.7	12.2	16.6
Postorbital length	7.8	9.4	11.4
Width	5.3	6.5	8.7
Height	5.1	5.2	6.4
Areola:			
Width	1.3	1.7	1.9
Length	2.8	3.4	4.3
Rostrum:			
Width	1.4	2.4	3.0
Length	1.8	2.9	3.4
Chela:			
Length, mesial margin of palm	2.8	1.9	3.2
Width of palm	3.2	2.0	4.4
Length of lateral margin	6.6	4.9	8.8
Length of dactyl	3.0	2.7	3.6
Abdomen:			
Width	4.6	5.4	6.1
Length	11.4	13.1	16.7

Color Notes: General tone grayish tan over cephalothorax and cephalic part of abdomen, fading caudally, with telson and uropods pale gray. In more detail, dorsum of cephalic section of carapace pale reddish tan; lateral surface bearing paired almost U-shaped rust markings, bases of which abutting orbit, with one arm extending caudally, flanking postorbital ridge and turning dorsomesially and ending in dark spot slightly posterior to midlength of gastric region; other arm of "U" straight, and, lying on level slightly dorsal to junction of 2 segments of cervical groove, ending in dark spot adjacent to cervical groove; cephalic area between suborbital angle and branchiostegal spine cream white. Branchiostegites with conspicuous, paired, dark reddish brown dorsolateral longitudinal stripes originating at cervical groove and continuing caudally to second abdominal tergum; in addition, paired cream white longitudinal stripes situated laterally and 2 or 3 conspicuous dark brown spots present cephaloventrally, interspersed with irregular cream white markings; latter also flanking ventral margin of branchiostegites to caudal margin. Dorsolateral dark brown stripe on branchiostegite continuing onto abdomen where almost black on first abdominal tergum, fading slightly on second, and becoming broken on succeeding terga where represented by short,

cephalically situated segments; latter progressively smaller and paler caudally, that on sixth barely perceptible. Reduced first abdominal pleuron white; each succeeding pleuron bearing large, subtriangular reddish black spot. Dorsum of all terga suffused with rust between dark linear series of "segments," very dark on first tergum and fading caudally to base of telson, nevertheless intensifying caudally on each of second through sixth terga. Telson and uropods mostly pale but former with cephalomedian dark spot and paired ones at caudolateral corners of cephalic section. Peduncles of antennule and antenna pale gray mottled with rust spots, some of which forming lines laterally and along dorso-distal margins of podomeres; antennal scale with gray stripe along lateral margin. Chelipeds largely grayish tan but with dorsally situated rust markings on distal part of merus, over much of dorsal and dorso-mesial part of carpus, and forming line along mesial margin of palm of chela; distal extremities of fingers of chela very pale. Remaining pereopods faintly mottled with rust or gray over pale gray.

Type-locality: Backwaters of Bayou Bodeaw (Red River Basin) in borrow ditch along Sunray Road, 4 miles (6.4 km) north of Lewisville, off State Route 29, Sec. 14, R. 24W, T. 15S, Lafayette County, Arkansas. The body of water in the ditch varied in width from about 2 to 7 meters, and in the area where this crayfish was found was no more than 0.5 meter deep. The bottom consisted largely of sandy clay overlain by decaying leaves. At the time the collection was made on 26 April 1975, the water was somewhat cloudy, and *Ludwigia* sp., *Utricularia* sp., and grasses (particularly the latter) were conspicuous aquatic plants in the vicinity of where the specimens were taken. The dominant shoreline trees were members of the genera *Pinus* and *Quercus*. *Crataegus* sp. was also abundant. Occurring in the ditch with *Bouchardina robisoni* were four other crayfishes: *Cambarellus* sp., *Cambarus* (*L.*) *diogenes* subsp., *Procambarus* (*G.*) *tulane* Penn (1953:163), and *Procambarus* (*O.*) *geminus* Hobbs (1975:1).

Disposition of Types: The holotypic male, allotypic female, and morphotypic male, numbers 147146, 147147, 145743, respectively, are deposited in the National Museum of Natural History (Smithsonian Institution). The paratypes, of which some of the second form males are being retained alive (anticipating a molt to first form), are in the Smithsonian Institution and the collection of Raymond W. Bouchard.

Range and Specimens Examined: Known only from the type-locality—1 ♂ II, 13 June 1974, collectors unnamed; 1 ♀, 25 April 1976, R. W. Bouchard, coll.; 4 ♂ I, 12 ♂ II (2 molted to first form in June and July), 24 ♀, 26 April 1976, R.W.B., H. W. Robison, M. T. Kearney, and H. H. H., Jr., coll.

Variations: The most conspicuous variations noted are those associated with the rostrum and chela. There is evidence that the young of this species bear well defined marginal spines on the rostrum which become smaller with age; in the largest specimens there is hardly a trace of even an emargination at the base of the acumen. Not correlated with

size or age of the specimen is a rather striking difference in the subrostral ridges. In some specimens, they are visible in dorsal aspect from the orbit to the base of the acumen; in others, they cannot be seen except in the caudalmost part of the orbit; in the majority, they disappear beneath the rostral margin posterior to midlength of the rostrum. The strong dimorphism in the chelae of the males and females was noted in the above descriptions, a difference which not only involves the much longer palm in the male but also the arrangement of the denticles on the opposable surfaces of the fingers. In the smaller second form males, the denticles on the fingers are arranged in a single row, as they are in the female; in the morphotypic male, the largest specimen available, however, there is a band of denticles along both fingers; in none of the males are there well defined tubercles on these surfaces although in some there are sclerotized patches among the denticles which seem to occur in areas corresponding to the positions of tubercles on the chelae of the females. The distribution of tubercles along the mesial half of the palm of the chela may not be so variable as seems apparent. Because of the pilosity and small size of the chelae, it is likely that some of the tubercles are being overlooked. In all of them, there is one row of small sclerotized tubercles along the mesial margin of the palm; in the largest specimen, the morphotype, there are 18 tubercles; in none of the others does there appear to be more than 13 or fewer than 8. In one of the first form male paratypes, a second irregular row of tubercles flanks the dorsolateral side of the mesial one, and other tubercles lie between and proximomesial to the 2 rows. A first form male as large as the morphotype is needed to determine the precise nature of the arrangement of the tubercles.

While there are variations in the annulus ventralis and postannular sclerite, most appear to be associated with the size of the female and/or degree of calcification of these structures. In the majority of the smaller specimens, for example, the differences in surface relief of the annulus is much less marked than in the larger females.

For differences noted in proportions, see Table 1 and the "Diagnosis."

Size: The largest specimen available is a second form male which has a carapace length of 16.6 mm (postorbital carapace length 11.4 mm). Corresponding lengths of the largest and smallest first form males are 11.2 (8.5) and 10.7 (7.8) mm; those of the largest female are 13.4 (9.9) mm.

Life History Notes: The only data available include the occurrence of first form males on April 26, and, among the second form males obtained at that time, one molted in the laboratory to first form on June 3, and another did likewise during July. Neither ovigerous females nor ones carrying young have been found.

Relationships: The relatively small size of this cambarine suggests a close affinity between it and members of the genera *Faxonella* and *Hobbseus* (see Hobbs, 1974:12-14) to both of which it is certainly allied, but it also shares certain characters with members of the genus

Orconectes. As pointed out above, when initially I examined the single second form male sent to me by Dr. Robison, I tentatively assigned it to the genus *Hobbseus*, chiefly because of the 2 short rami on the first pleopod and the single row of sclerotized tubercles along the mesial margin of the palm of the chela. The absence of any visible rudiment of bosses on the coxae of the fourth pereopods also supported the tentative generic assignment. A possible close kinship to the 3 members of the genus *Faxonella* seemed unlikely in view of the fact that the rami of the first pleopod were not only short but also subequal in length.

When the first form male and the female became available, the original generic assignment became untenable. The first pleopod, instead of resembling that of either *Faxonella* or *Hobbseus*, was more similar to those of certain members of the genus *Orconectes* (for example, *O. i. incanis* Cope (1872), *O. difficilis hathawayi* Penn (1952), *O. sloanii* (Bundy, 1876), and *O. kentuckiensis* Rhoades (1944)). The slender curved hook on the ischium of the third pereopod is more similar to that of species of the genus *Faxonella* and the troglobitic *Orconectes* than to those of *Hobbseus*. The annulus ventralis is freely movable as it is in the 3 just-mentioned groups, except in the more advanced *Orconectes* (*O. d. hathawayi*, *O. sloanii*, and *O. kentuckiensis*). It differs from the primitive (troglobitic) *Orconectes* in lacking a prominent boss on the coxa of the fourth pereopod, in this respect resembling the members of *Faxonella* and *Hobbseus*. From *Faxonella*, it differs primarily in the structure of the first pleopod of the male and in the annulus ventralis of the female; despite the similar attitude of the rami of the pleopod, the difference in their lengths is comparatively slight, not one long and the other short as in *Faxonella*, and the ventral surface of the annulus ventralis is decidedly less complexly sculptured.

From *Hobbseus*, it differs primarily in the form of the central projection of the first pleopod; while the inclination of this ramus is similar to that of *H. orconectoides* Fitzpatrick and Payne (1968), its broad, short, bladelike form is strikingly different from the comparatively long, tapering, acute corresponding element in all members of the genus *Hobbseus*. Moreover, there is no caudomesial boss on the coxa of the fifth pereopod as is typical of members of the latter genus.

The annulus ventralis, while far less complexly sculptured than in members of *Faxonella*, resembles those of members of the latter at least as closely as it does those of members of the genus *Hobbseus*.

Because of the unique combination of characters pointed out above, I am proposing that it be assigned to the monotypic genus *Bouchardina*, the ancestors of which must have been derived from the archiorconectoid line (Hobbs, 1969:119), the same as that from which the members of *Faxonella*, *Hobbseus*, and *Orconectes* were postulated to have arisen.

Etymology: This crayfish is named in honor of Henry W. Robison who not only sent the first specimen of this crayfish I had seen to the Smithsonian Institution, but who has also added numerous crayfishes to

the national collection as well as assisted in securing the series of specimens obtained in April.

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